



Project Overview

Combi Informatics System

Alamgir Karim

Planning & Implementation:

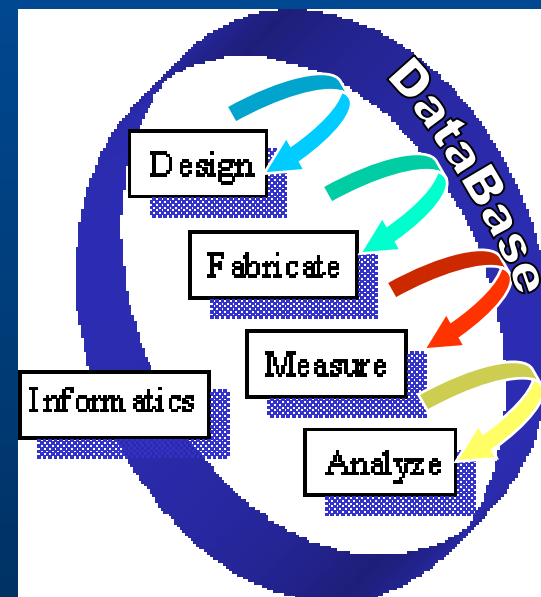
Polymers Division: Wenhua Zhang, Mike Fasolka, Amit Sehgal, Eric J. Amis

CTCMS: Andy Roosen, James Warren

Project Goal – Closing the Loop

Informatics & feedback for:

- Data management, integration
- Data visualization
- Automated data entry, retrieval
- Protocols for standardized data formats
- Link to and refine other Combi processes formats
- Library of scientific combi-data



Progress

- Database system selection
- Database server setup
- Security / data protection issues
- Basic framework of the database
- Backbone interface programming

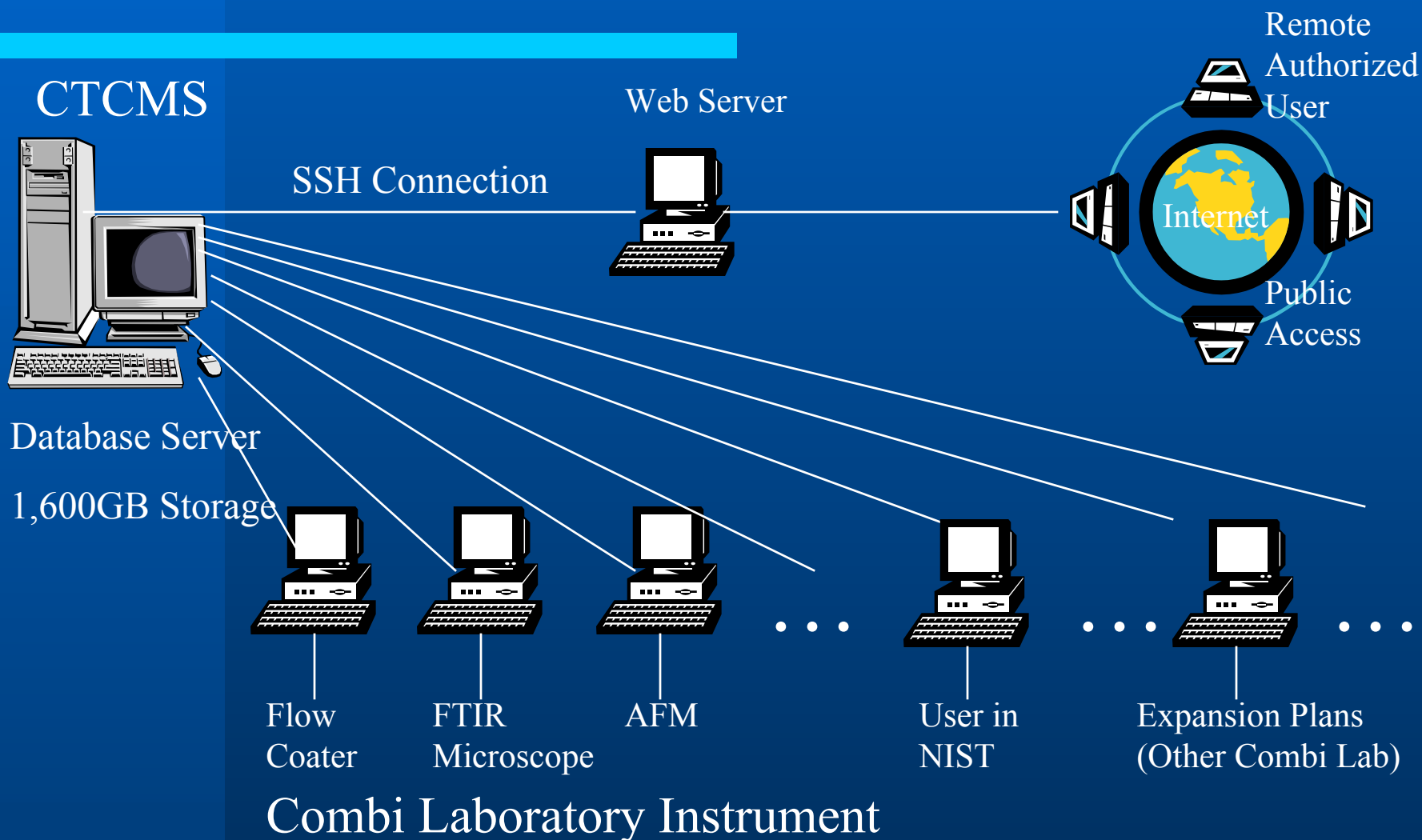
PostgreSQL

- Sophisticated Object-Relational DBMS
- Supporting almost all SQL (Structured Query Language), including subselects, transactions, and user-defined types and functions
- One of the most advanced **open-source** database available anywhere
- Commercial support available

FOR MORE INFO...

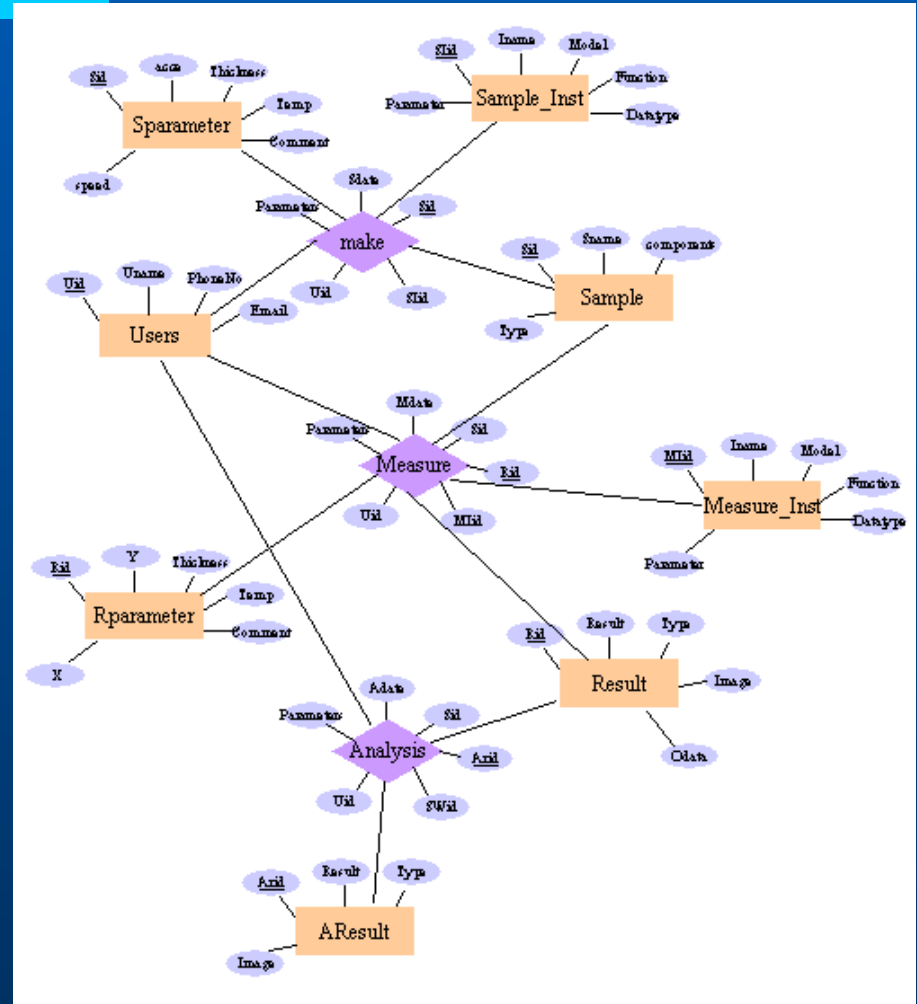
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Combi Informatics System



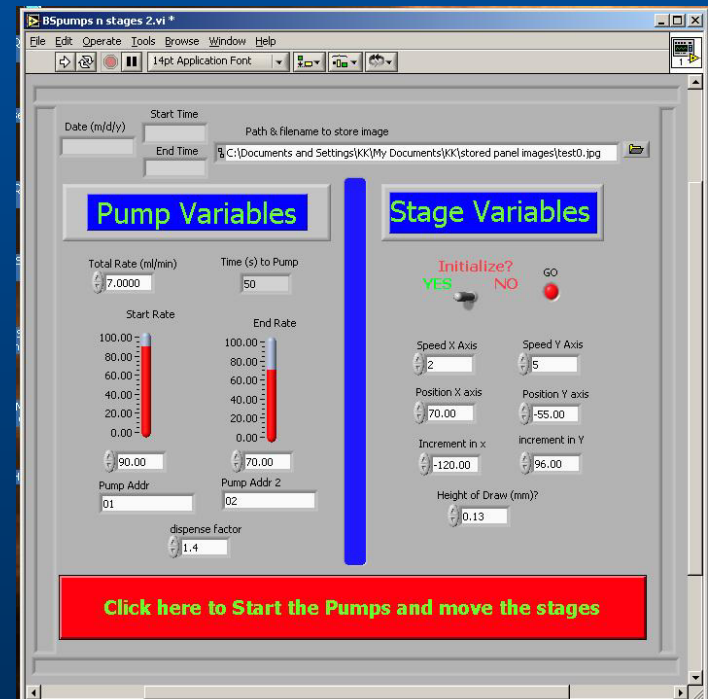
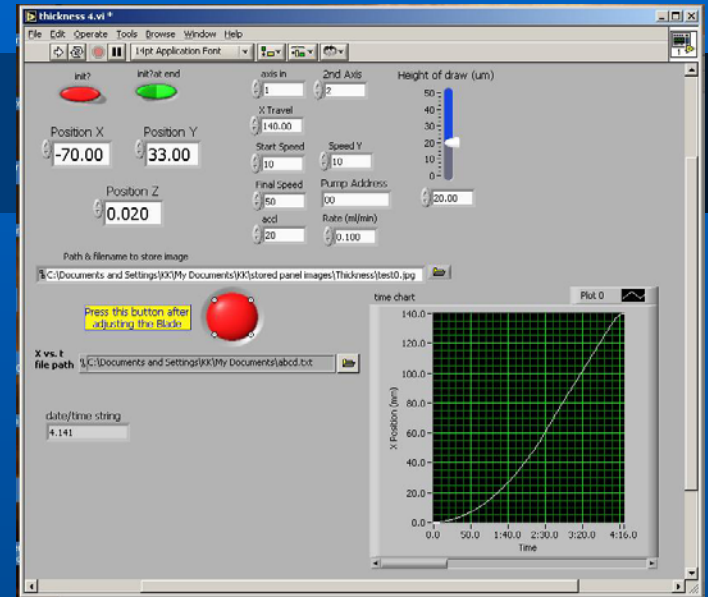
Basic Structure of Database

- Straight forward structure in consideration of automation & expansion
- Must reflect the frame-work of the Combi lab
- Establish basic protocol of Combi experiment set (All stages of Combi processes)
- Large objects, such as image, video, result chart, original data file storage



Instrument Interface Programming

- Instrument E-notebook
- Straight forward, use friendly
- User specific access levels



Query

Query: `select result.fname, result.image, rparameter.thickness, result.itype, rparameter.temperature, rparameter.x, rparameter.y, sample.sname, sample.component, users.uname, minstrument.minname, sparameter.speed, sinstrument.sinmodel, sinstrument.sinname from result, rparameter, sample, users, minstrument, sparameter, sinstrument where rparameter.x <15 and result.rid=rparameter.rid and measure.rid=result.rid and measure.sid=sample.sid and`

Generate Query

Execute

Result

☒ File Name

☒ Image

☒ File Type

☐ Result

☐ Result Type

☐ Original Data

Measure

☐ Measuring Date

☒ Thickness

☒ Temperature

☒ X

☒ Y

☐ Comment

Minstrument

☒ Instrument Name

☐ Model

☐ Function

☐ Data Type

Sample

☒ Sample Name

☒ Component

☐ Type

User

☒ User Name

☐ Phone

☐ Email

Make

☐ Making Date

☒ Speed

☐ Temperature

☐ Comment

Sinstrument

☒ Instrument Name

☒ Model

☐ Function

☐ Data Type

Automatic query generation
easy to use, no SQL knowledge
required. Search by range, type,
user, sample, file, etc.

Result table, image
and other objects can
pop-up with a click

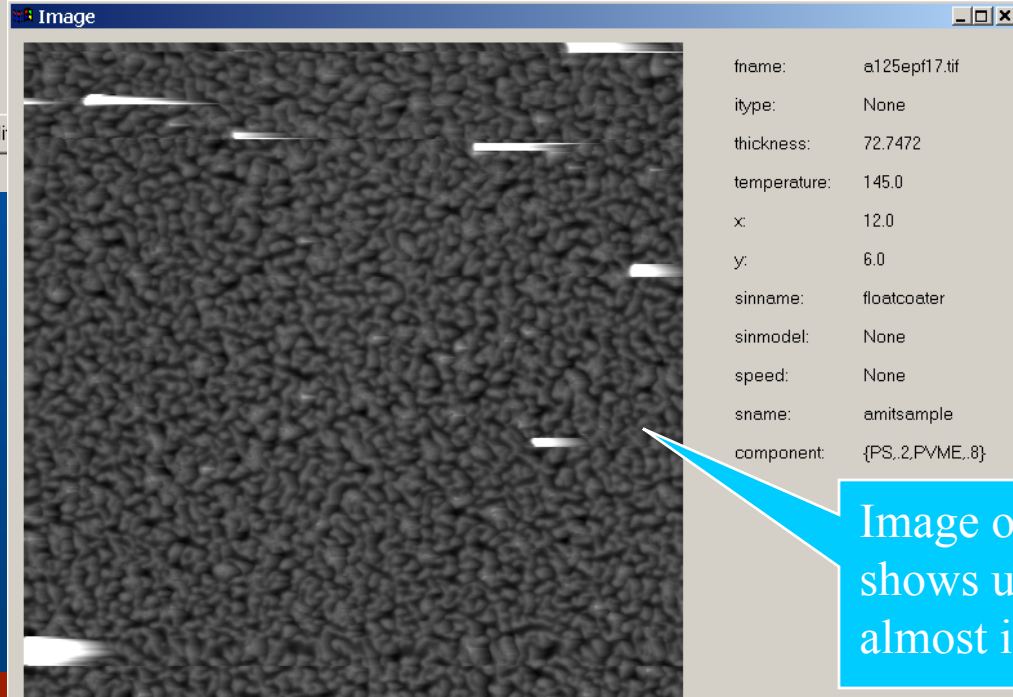
Table:

	fname	image	itype	thickness	temperature	x	y	sinname	sinmodel
1	a125epf2.tif	18548	None	59.017675	145.0	9.0	3.0	floatcoater	None
2	a125epf3.tif	18550	None	59.06855	145.0	12.0	3.0	floatcoater	None
3	a125epf4.tif	18552	None	60.23185	145.0	15.0	3.0	floatcoater	None
4	a125epf14.tif	18568	None	None	145.0	3.0	6.0	floatcoater	None
5	a125epf15.tif	18570	None	None	145.0	6.0	6.0	floatcoater	None
6	a125epf16.tif	18572	None	None	145.0	9.0	6.0	floatcoater	None
7	a125epf17.tif	18574	None	None	145.0	12.0	6.0	floatcoater	None
8	a125epf18.tif	18576	None	None	145.0	15.0	6.0	floatcoater	None

Insert

Delete

Update



Data Mining

Image object with its conditions
shows up on user's desktop
almost instantaneously

Software Technology

- **Programming Language**
 - Python (Open source, Object oriented)
- **Secured Shell Connection with the Database server**
- **ZOPE selected as Web server**
 - Base on Python, Open source, Easy to maintain, Database connectivity
- **Integration with current data analysis software (mostly IDL)**
- **Consideration of future interface with other softwares**

Team/Resources (In planning stage)

● Current Team and Resources

– Workforce:

- Wenhua Zhang, Mike Fasolka, Amit Seghal, Kapel Kapeelashwar, Alamgir Karim, Eric Amis
- Andy Roosen, James Warren

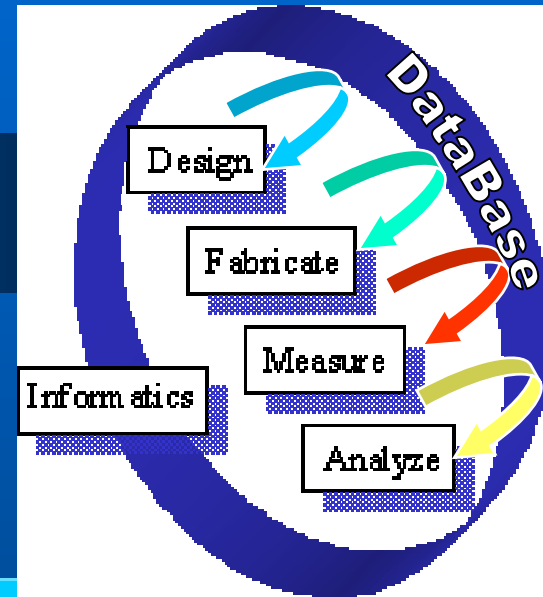
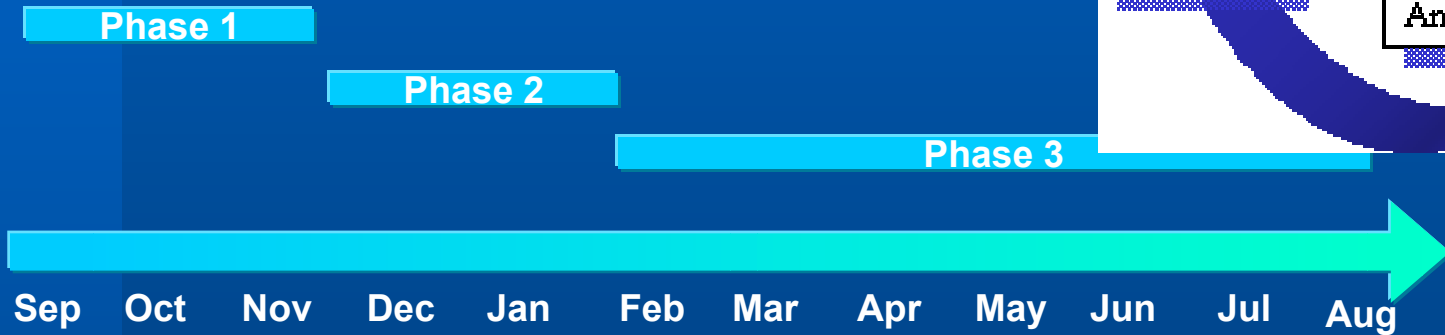
– Equipment:

- Presently identified: Polymer Combi Lab instrument, database server in CTCMS

– Locations

– Support & outside services

1-Year Schedule



Phase 1: Database setup and programming, e-notebook

Phase 2: Machine programming and automatic data entry and retrieval

Phase 3: Analytic software and feedback automation